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A Test of the Efficiency of Various Planting Tools as
Determined by First-year Survival of Several Sources of Ponderosa
Pine Planting Stock on Planting Sites in Southern Idaho.

Progress Report
by
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Survival on three of the six plots planted in this study was sufficiently uniform for an analysis of variance on the effect of source of stock and method of planting on first-year survival. Analysis of the data on these plots, numbers 81, 82, and 83, showed that significant differences in first-year survival exist between methods of planting as well as between sources of stock.

In table 1 of the report of October 26, 1939 by Maki and Smith the data show that the two shovel methods of planting resulted in a first-year survival which was approximately 10 percent greater than the mean of all methods. The best measure of the efficiency of the various methods is obtained by calculating the planting time per surviving tree as in table 1. This tabulation shows that the council bar is the most efficient tool with a planting time of 2.5 minutes per surviving tree. Just how significant this apparent superiority is could be determined by calculating the time per surviving tree for each row on each plot and making an analysis of variance on the data thus obtained. The results may still be indefinite, however, if there was a difference in proficiency in the use of the various tools on the part of the planting crew or if every man on the crew did not use every tool on each plot.

This is OK, but be careful of interpretation + application; in practice must consider all planting costs, also may sacrifice some efficiency in interest of higher initial seedling.

Might show out worst plots and perhaps worst stocks in such an analysis.

Differences in first-year survival between sources of stock are contrary to a well established rule of planting that stock grown from seed from a local seed source and in a local nursery is better than any other stock. The exceptionally high survival of the Wind River stock as shown in table 1 in the report of October 26, 1939 is probably the result of mishaps in the growing and handling of the stock from the other nurseries and better care of Wind River stock.

*I would like it to be
need experiment
in form, soil, shade etc.
E.H.M.*

Continuation of observations on this study are not recommended for the following reasons: (1) First-year survival data probably ^{show} ~~show~~ the differences between treatments as well as later survival data would show them. (2) Some plots have so few live trees left that survival data would be too low to be useful. (3) On plots where survival is adequate, numerous natural seedlings are present which are indistinguishable from the planted trees in many cases. These reasons are based on an inspection of the plots, July 1, 1941.

Table 1.- Planting tool efficiency

Method	Time for plant- ing 100 trees (minutes)	Survival (percent)	Planting time per surviving tree (minutes)
Deep shovel	96	30	3.2
Shallow shovel	78	27	2.9
Slit shovel	40	12	3.3
Mattock	65	22	3.0
Council bar	47	19	2.5
Council offset bar	42	13	3.2
R-1 tool	44	11	4.0